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STRUCTURAL BASIS FOR THE DESIGN OF KINASE INHIBITORS IN CANCER CHEMOTHERAPY AND NEURODEGENERATIVE DISEASES, ESPECIALLY OF THE CK1 KINASE FAMILY

Key words: kinases, cancer chemotherapy, neurodegenerative diseases CK1 kinase family.

Structural basis for the design of kinase inhibitors in cancer chemotherapy and neurodegenerative diseases will be presented and discussed. The main accent will be done on study of CK1 kinase family.

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RESEARCH TRENDS IN FOOD BIOTECHNOLOGY AT URAL FEDERAL UNIVERSITY*

Keywords: food biotechnology, biotransformation, food wastes, plant materials, biologically active substances.

Food biotechnology as a research area was appeared at the Department of Technology for Organic Synthesis of the Ural State University, Yekaterinburg, Russia in 2014, when the Master's Program with the same name was launched. Nowadays, there are 4 main research activities in Food Biotechnology within the department. They are as follows:

– biotransformation of food wastes and plant materials into valuable products;

– design of functional products enriched with biologically active and essential substances;

– microencapsulation of essential and biologically active substances for targeted delivery;

– production of low alcoholic drinks with new properties.

By now, we acquired experience in the biotechnological production of astaxanthin using *Phaffia rhodozyma*, optimizing nutrient media prepared on the basis of food wastes such as soy and sugar molasses [1]. We developed environmentally friendly and at the same time low-cost extraction methods on extraction of isoflavones that are very relevant at present. In particular, studies have been carried out on the extraction of soy molasses isoflavones based on the fermentation of soy molasses with alcohol yeast Saccharomyces cerevisiae, and soy molasses and kudzu roots using natural deep eutectic solvents (NADES), recognized as environmentally friendly, "green" solvents or 21st century solvents [3]. It was shown that the selection of optimal extraction conditions in these cases allows to achieve sufficiently high yields of isoflavones. Vegetable yogurt based on oat flakes enriched with soy molasses' isoflavones was prepared and its organoleptic, microbiological and physico-chemical properties were studied [4]. We found the optimal conditions for enzymatic treatment of brewer's spent grains with *Cellolux*® *A* (LLC Sibbiopharm, Russia) containing cellulose, xylanase and beta-glucanase, namely, grains-to-water ratio 1:10; enzyme dose 23 units of cellulase activity per 1 g brewer's spent grains; hydrolysis time 2h; temperature 50°C; pH 5 in order to apply them as a base for confectionery such as grainy sweets and biscuits. Lysis of *Chlorella vulgaris* cell wall in distilled water and further treatment the suspension with Cellolux® A and proteolytic enzymatic preparation *Distizim Protacid Extra*® (Erbslöh Geisenheim, Germany) containing acidic protease at optimal conditions allowed to isolate and to obtain high chlorella growth factor (CGF) index. The hydrolysis of soy flour with *Distizim Protacid Extra*® at optimal conditions (soy flour-to-water ratio 1:6, hydrolysis time 2h; temperature 25 °C) yielded the maximum amount of arginine, valine and lysine. The hydrolysate was added to bread substituting water to enrich it with the above-mentioned essential amino acids to produce a food for children as well as the nutrition products for the elderly people. There is experience in the extraction of beta-glucans from oatmeal and waste brewing yeast with their enrichment of milk yoghurts of different fat content. Optimum fortification conditions were selected and the organoleptic, microbiological, and physicochemical properties of enriched yoghurts were studied. These yogurts were found to exhibit an increased antioxidant activity compared to conventional unenriched products [5]. A technology has been developed for the production of gastro-soluble microcapsules based on pectin hydrazide and cellulose for encapsulation of salts, vitamins and biologically active substances such as chlorella growth factor for directed delivery.

A number of works on the design of low-alcohol drinks (various types of beer) using microscopic mushrooms *Monascus puerperium*, berry, fruit raw materials at the maturation stage and lactic acid bacteria at the fermentation stage were published. Appropriate technologies have been developed, the organoleptic, microbiological and physico-chemical properties of the developed drinks have been studied [6, 7]. We also have some experience working with laboratory animals, they studied the effect of extracts of isoflavones isolated from kudzu roots on the biochemical, immunological, and histological characteristics of laboratory animals with type 2 diabetes [8].

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